

REMARKS

Claim 1 has been amended to incorporate therein the recitation of claims 6 and 8. Claims 6 and 8 have been canceled. Claim 7 has been amended to depend from claim 1. Claim 3 has been amended to correct awkward language. No change in claim scope is intended.

New claim 11 which calls for a compositional gradient of at least 0.6 eV from the bottom of the lower clad layer to the top of the current diffusion layer finds support at page 19, lines 22-26 of the specification. New claims 12 and 13 which characterize the difference in composition gradient in terms of a change in B content find support at page 19, lines 8-17 of the specification.

Review and reconsideration on the merits are requested.

Claims 1-10 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite with respect to the composition-graded layer which serves as both the current diffusion layer and the cladding layer. The Examiner rejected claim 10 presumably for the reason that it lacks antecedent basis in claim 1 from which it depends for the “composition-graded layer”.

Applicants respond as follows.

The specification at pages 17-20 describes that in Embodiment 2, both the cladding layer and the current diffusion layer are composed of a boron-phosphide-based semiconductor having a boron compositional gradient such that the bandgap increases in the thickness direction from the light-emitting layer to the top of the current diffusion layer. Claim 8 (as introduced into claim 1) has been modified accordingly. Claim 10 has been amended to recite that the Ohmic contact electrode is joined to the current diffusion layer.

It is respectfully submitted that the claims as amended fully comply with 35 U.S.C. § 112, and withdrawal of the foregoing rejection is respectfully requested.

Claims 1-4, 6, 8 and 10 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. 2003/0234400 A1 to Udagawa. Fig. 6 of Udagawa was cited as meeting each of the terms of the rejected claims, including current diffusion layer 607 comprising n-type BP (i.e., a conductive boron-phosphide-based semiconductor) having a bandgap (3.1 eV) at room temperature wider than that of light-emitting layer 604 (2.9 eV). As to claim 8, the Examiner cited paragraphs [0127] and [0128] of Udagawa as disclosing upper clad layer 605 having a carrier concentration of $2 \times 10^{18} \text{ cm}^{-3}$ and current diffusion layer 607 having a carrier concentration of $8 \times 10^{18} \text{ cm}^{-3}$ (i.e., having a compositional gradient).

The Examiner considered claim 8 to be anticipated because the limitation as to “compositional gradient,” given its broadest reasonable construction could encompass a gradient in carrier concentration. To distinguish over the cited prior art, claim 1 has been amended to incorporate therein the recitation of claim 8, and to further characterize the compositional gradient as being a boron compositional gradient such that the bandgap increases in the thickness direction. U.S. 2003/0234400 A1 to Udagawa does not meet this limitation of amended claim 1 and therefore does not anticipate. Withdrawal of the foregoing rejection under 35 U.S.C. § 102(b) is respectfully requested.

Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 2003/0234400 A1 to Udagawa. Claim 7 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Udagawa in view of U.S. 2004/0026703 A1 to Adomi et al. Claim 9 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Udagawa in view of U.S. 2003/0218180 A1 to Fujiwara.

Applicants rely on the response above with respect to the rejection of claims 1-4, 6, 8 and 10 over Udagawa alone.

Withdrawal of all rejections and allowance of claims 1-5, 7 and 9-13 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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